

# MISSOURI CONSERVATIONIST

VOLUME 81, ISSUE 8, AUGUST 2020  
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AUGUST 2020  
VOLUME 81, ISSUE 8



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## MISSOURI CONSERVATIONIST



### ON THE COVER

The sun rises over the Grand River Grasslands in northwest Missouri.

📷 **NOPPADOL PAOTHONG**

24–70mm lens, f/16  
1/5 sec, ISO 200

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# Inbox



## Letters to the Editor

Submissions reflect readers' opinions and may be edited for length and clarity. Email [Magazine@mdc.mo.gov](mailto:Magazine@mdc.mo.gov) or write to us:

MISSOURI  
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**PHOTO BLIND**  
I enjoy your great magazine each month. I am always impressed with the beautiful photographs taken by Noppadol Paothong. He must spend all his time in a blind with his cameras.

Perry Jenks  
via email

## INSPIRING INSIGHTS

Although I have lived in five other states in the 35 years since I left Missouri, my twin sister gifts me the *Missouri Conservationist* annually. While I love the magazine, and devour it each month when it arrives, I've grown fond of reading Sara Parker Pauley's *Up Front*. She has such a reflective style, integrating life circumstances with nature. I'm always curious how she has interfaced with the outdoors and connected her experience to life. Keep up the inspirational messages. We need them now more than ever!

Camille Consolvo Great Falls, MT

## MISSOURI'S LEAST WANTED

I appreciated the article in the April issue about invasive species [*Missouri's Least Wanted*, Page 8]. I hope it helps people realize what a nuisance they are and stop planting them, and nurseries stop selling them. In my area of Jackson County, it's especially true of the Callery pear. To me, these are the kudzu of the tree world. I have enjoyed the *Conservationist* since the 1950s. Great job MDC!

Ted Tompkins Blue Springs

## KING BIRD

The article on the eastern kingbird [June, Page 32] was timely as we have had a nesting pair on our deck the last four years. I recently identified them as eastern kingbirds. Our pair is currently raising their second clutch of three babies. Thanks for the great photos and information on this species.

Don Hellmann via email



Eastern kingbird



## KIDS LOVE THE CONSERVATIONIST

My husband and I have always loved reading the *Missouri Conservationist*, but now our daughter (20 months) has started "reading" it before we get a chance. Thank you for all the great wildlife pictures. She especially liked telling us that the bear had to go "night night" [*Living With Wildlife*, June, Page 16].

Maggie Jones Boone County

The Missouri Department of Conservation is so wonderful. The *Missouri Conservationist* is my son's favorite reading material. (He is 18 months old.) He loves to turn the pages and look at all the animals, people, and plants! The beetles and crawfish in recent magazines have been wonderful. I have had to repair the magazines with tape and staples — not because he tears them but from sheer frequency of use! He brought me the center section, very concerned, when the staples finally gave out and released. Recently, he led me from my parents' house to a small creek on conservation land in Cape Girardeau that he had played in the day before. He led me on the half-mile walk on the way there, taking the correct turns (until we got to the last segment and he had to run ahead).

Thank you to the Missouri Department of Conservation! Thank you to the magazine and the Nature Center staff, the agents, and the people who maintain the trails, and everybody else!

Jennifer Ann Layton Johnson St. Louis

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## Have a Question for a Commissioner?

Send a note using our online contact form at [mdc.mo.gov/commissioners](http://mdc.mo.gov/commissioners).





### Want to see your photos in the Missouri Conservationist?

Share your photos on Flickr at  
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email [Readerphoto@mdc.mo.gov](mailto:Readerphoto@mdc.mo.gov),  
or include the hashtag #mdcdiscovernature  
on your Instagram photos.



1

1 | Bobcat by  
[lindashannonmorgan](#),  
via Instagram

2 | Immature black-  
crowned night heron  
by [Bill Michalski](#),  
via Flickr

3 | Buttonbush  
by [Dianne Argo](#),  
via email



2



3

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# Up Front

with Sara Parker Pauley

✕ Ah, the dog days of summer — the garden that brought such joy in spring now makes me weary with pulling weeds, putting up produce, or better yet, trying to give it away. There are those who try to escape August's inferno for cooler and drier destinations. For those of us left behind, we fantasize of a campfire's warmth on a chilly fall evening. But let's not be too quick to see the calendar flip its page — there are many magical things about summer's finale.

August memories take me to my Granny's farm in the Ozark hills, when the music of whip-poor-wills at dusk would summon the coolness of night (see Page 22 for an article on night-jars), or to the banks of Bryant Creek and the thrilling sounds of a smallmouth bass smashing a jitterbug lure wobbling on the water's surface.

Such swan songs of summer abound for all — from late nights gazing at Perseus meteor showers to watching hummingbirds at the feeder preparing for their fall migration. We can taste delicious ripened wild black cherries and elderberries or stand in awe of late blooming prairie wildflowers, such as blue sage, sweet coneflower, asters, and goldenrod, which provide much needed food for our migrating monarchs (see Page 10 for an article on prairies).

So friends, let's not wish the August days away too soon. There is much beauty to behold and outdoor living to be had. Time will move us along soon enough.

*Sara Parker Pauley*

**SARA PARKER PAULEY**, DIRECTOR  
[SARA.PAULEY@MDC.MO.GOV](mailto:SARA.PAULEY@MDC.MO.GOV)

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Printed with soy ink





# Nature LAB

by Bonnie Chasteen

Each month, we highlight research MDC uses to improve fish, forest, and wildlife management.

## WILDLIFE MANAGEMENT

### Northern Bobwhite Study

✳ Since the late 1960s, Missouri northern bobwhite populations have dropped by 80 percent, largely due to land-use changes. Conservation areas and other public lands comprise critical habitat for bobwhite.

“Managers need to know the best combination of habitat and management practices to conserve Missouri’s bobwhite populations throughout the year,” said MDC Resource Scientist Tom Thompson. He and colleagues from the University of Missouri (MU), MDC, and the U.S. Forest Service (USFS) worked to meet this need for informed conservation.

From 2016 to 2019, their study of bobwhite population dynamics focused on five conservation areas in southwest Missouri. Two are traditionally managed areas that include cropland and food plots for wildlife use. The other three are extensive native grasslands managed with prescribed fire and conservation grazing.



The bobwhite crew fits young quail with radio transmitters on a morning brood capture. Left to right, counter-clockwise: Emily Sinnott, James Heuschkel, Trevor Lindsay, and Nick Yerden.

Three-year effort identified habitat and management that support bobwhite broods and year-round populations

The researchers used a full annual cycle population model, which combined count, nesting, and radio-tracking data to estimate site-specific effects of traditionally managed areas versus native grassland areas on bobwhite seasonal survival, fecundity, and population growth.

“Results from this phase showed that bobwhite on native grasslands hatched more young and had higher adult breeding season survival,” MU researcher Emily Sinnott said. Population growth was most strongly correlated with nonbreeding season survival from Nov. 1 through April 30 and greatest on the largest native grassland site, Wah’Kon-Tah. USFS Research Wildlife Biologist Frank Thompson added, “While bobwhite populations on native grassland had the best growth rates, they were still declining, indicating we still need to learn more about bobwhite management and population viability.”

## Northern Bobwhite Study at a Glance

### Results

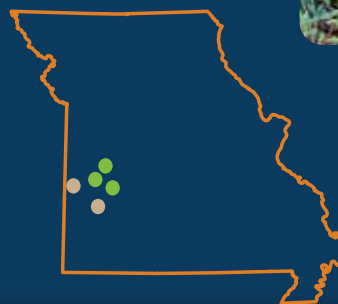
- Bobwhite population growth was most strongly correlated with winter survival and nesting success
- Native grasslands managed with prescribed fire and grazing had the highest rates of nest success, adult breeding survival, and population growth

### Possible Applications

- On conservation areas and other public lands managed for bobwhite
- To support investments in public land supporting good bobwhite populations
- To support private landowners near bobwhite population strongholds

### Full Annual Cycle Methods 2016–2019

- Nest monitoring
- Spring whistle count
- Radio telemetry



- Grassland Conservation Areas
- Traditional Conservation Areas



# In Brief

News and updates from MDC



To find out more on the Missouri Stream Team program, visit [mostreamteam.org](http://mostreamteam.org).

## THANK YOU VOLUNTEERS

MDC VOLUNTEERS LOGGED MORE THAN 250,000 HOURS IN OUTREACH EFFORTS, CITIZEN SCIENCE, PROGRAM SUPPORT, AND MORE IN 2019

by Jill Pritchard

➔ MDC extends a big thank you to its volunteers for another year of hard work and dedication supporting conservation initiatives and helping to educate others about Missouri's fish, forest, and wildlife resources.

"We so appreciate and value our volunteers," said MDC Volunteer and Interpretive Program Coordinator Syd Hime. "These individuals are assets to the department as they connect with the public and help to educate them about Missouri's natural resources."

More than 1,600 volunteers donate their time and energy to MDC through the Missouri Master Naturalist program, shooting ranges, nature centers, interpretive sites, Hunter Education programs, and fishing instruction. Nearly 3,000 people volunteer as part of the Missouri Forestkeepers Network, which is a forest-health monitoring program that educates the public about tree care and helps monitor forest health. Additionally, nearly 30,000 people volunteer their time helping to improve Missouri's streams through the Stream Team program.

While the current public-health crisis has slowed volunteer duties and opportunities, MDC encourages people to continue to support and connect with the outdoors as citizen scientists. The public can help conservation efforts by downloading mobile apps, such as iNaturalist or eBird, and sharing their observations. These nature observations can be done as a solo endeavor out on a trail or with family in the backyard.

"Though we're currently limited in our recruitment and engagement with our volunteers, citizen science is a great way to donate your time to contribute to conservation efforts," explained Hime. "We look forward to welcoming back our volunteers and to having more opportunities on the horizon."

For more information on citizen science or on activities you can do from your home, backyard, or neighborhood, visit [short.mdc.mo.gov/Z7D](http://short.mdc.mo.gov/Z7D).



## COMMENT ON WILDLIFE CODE REGULATIONS

Missouri State law requires each state agency to thoroughly review its rules and regulations every five years. To comply with that requirement, MDC initiated a comprehensive review of the *Wildlife Code of Missouri* in July. As part of that review process, MDC invites the public to provide thoughts and suggestions on existing regulations through August online at [short.mdc.mo.gov/Zia](https://short.mdc.mo.gov/Zia).

Learn more about the *Wildlife Code* and the MDC rule-making process at [short.mdc.mo.gov/Z8T](https://short.mdc.mo.gov/Z8T).

The Missouri Secretary of State publishes a list of agencies due to conduct their annual rule reviews in the July 1 edition of the *Missouri Register* each year. Learn more at [sos.mo.gov/adrules/moreg/moreg/2020](https://sos.mo.gov/adrules/moreg/moreg/2020).

## STAY HEALTHY IN THE OUTDOORS

With the current public-health emergency caused by COVID-19, MDC reminds people to continue to heed recommendations for hand washing, physical distancing, and all other public-health measures during outdoor activities.

Make outdoor activities as safe and enjoyable as possible by taking the following actions:

- If you have been sick in the last two weeks or have been in contact with someone who has been sick or became sick, please stay home for your health and the safety of others.
- Travel in a small group of 10 people or fewer.
- If a conservation area looks crowded or an area parking lot is full, please do not stop. Find another less-crowded location to enjoy nature and outdoor activities.
- Keep a proper physical distance of at least 6 feet while visiting areas and especially on trails.
- Avoid popular spots where people congregate, such as scenic overlooks, fishing docks, etc.
- Pack water, soap, and/or hand sanitizer.
- Get more information on best practices for keeping you and your family safe from the Centers for Disease Control and Prevention at [cdc.gov/coronavirus/2019-ncov](https://cdc.gov/coronavirus/2019-ncov).
- Visit our COVID-19 webpage for updates at [short.mdc.mo.gov/Zhi](https://short.mdc.mo.gov/Zhi).

# Ask MDC

## Got a Question for Ask MDC?

Send it to [AskMDC@mdc.mo.gov](mailto:AskMDC@mdc.mo.gov)  
or call 573-522-4115, ext. 3848.

**Q: I have seen what appears to be a hybrid of an eastern fox squirrel and an eastern gray squirrel. Since the species breed around the same time, is it common for squirrels to produce hybrids?**

→ The two species are separate and not known to hybridize. However, gray squirrels do have substantial color variation, so it could be an unusual color pattern that you are seeing. Additionally, color variation may be most noticeable when the animal is molting in preparation for its winter coat. For more information about eastern fox and eastern gray squirrels, visit [short.mdc.mo.gov/Z8G](https://short.mdc.mo.gov/Z8G).

## Q: What is this?

→ Named for their long orange and black horns and behemoth size (5 inches), hickory horned devil caterpillars (*Citheronia regalis*) are fierce in appearance, but harmless to handle.

These massive caterpillars eat a variety of trees found in Missouri, including ash, walnut, hickory, pecan, persimmon, sweet gum, sycamore, and sumac.

Hickory horned devils feed for about 35 days and then leave their host plant in search of loose soil. Once they find a good spot, caterpillars burrow into the ground and pupate. They spend the winter as pupae and then emerge the following summer as adult moths.



Hickory  
horned devil

The adult, known as the royal walnut moth, is a gigantic orange-veined beauty with a wingspan as large as 6¼ inches.

Adult moths — unable to feed — mate during their second night of adulthood and lay eggs the following evening. The eggs hatch within 6–10 days into tiny caterpillars with voracious appetites. This species has one generation per year.

## Q: What species of raptor are these?

→ These are Mississippi kites (*Ictinia mississippiensis*).

They occur most commonly in the southern Great Plains of Kansas, Oklahoma, Texas, southwestern Missouri, and





Mississippi kites

along the Mississippi River. This bird's breeding range is expanding northward, and they are found nesting as far north as mid-Missouri in open woodlands and are becoming more common in suburban areas.

Individuals perch and hunt from exposed sites, like this dead tree, but also take prey on the wing. These graceful and acrobatic aerialists swoop through the air in search of large insects. They skim low to catch prey near the ground and over cattle to snatch insects

flushed by the grazing animals. Sometimes, they pursue bats and other flying birds in the air. (Notice the eastern red bat clenched in the kite's talons.)

Males and females cooperate to build nests. The resulting shallow cup-shaped nests are typically 10–14 inches across and consist of loosely woven twigs from many tree species. Usually, each clutch includes one to three eggs.

For more information about Mississippi kites, visit: [allaboutbirds.org/guide/Mississippi\\_Kite/overview](http://allaboutbirds.org/guide/Mississippi_Kite/overview).



## Matthew Easton

RALLS COUNTY  
CONSERVATION AGENT

*offers this month's*

# AGENT ADVICE

Sept. 1 marks the opening of dove hunting season, an action-packed, fast-paced firearms sport. Before you head to the field and the feathers start flying, take some time to prepare. Get comfortable with your shotgun at a local shooting range. Practicing with clay pigeons can reinforce how to properly lead a target using the swing-through method. This method is imperative afield when you must maintain a safe firing zone. Before heading out, visit [short.mdc.mo.gov/Z4V](http://short.mdc.mo.gov/Z4V) for area-specific regulations, including information on shot. Finally, be sure to obtain a Small Game Hunting Permit and a Migratory Bird Hunting Permit before going afield. When you're safe and prepared, dove season can be lots of fun.

## What IS it?

Can you  
guess this  
month's  
natural  
wonder?

*The answer is on  
Page 9.*





## INVASIVE SPECIES

# MISSOURI'S LEAST WANTED

*Invasive nonnative species destroy habitat and compete with native plants and animals. Please do what you can to control invasive species when you landscape, farm, hunt, fish, camp, or explore nature.*

### Bush Honeysuckle

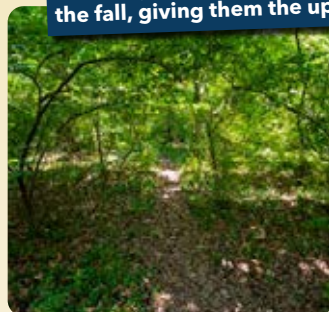
Introduced in the mid- to late-1800s for landscape ornamentals, wildlife cover, and erosion control, bush honeysuckles are native to eastern Asia. Depending on the variety, bush honeysuckle can grow from 6 to 20 feet tall. Leaves are green with a pale green, fuzzy underside. Twigs of all bush honeysuckles are thornless and hollow. In the spring, fragrant white or pink flowers appear, but become yellowish as the flower ages. The shrub's red berries mature in pairs near the origin of the leaves in September to October. Each berry contains seeds that are distributed by foraging birds and small mammals.

### Why It's Bad

"Bush honeysuckle are born competitors," said Nate Muenks, natural resource management planner. "Their leaves appear early in the spring and remain late into fall, giving them an advantage over native plants. They can grow in almost every habitat type and form a thick understory that limits sunlight to native plants, inhibiting seedling establishment. They also compete for soil moisture, nutrients, and may produce a chemical that inhibits native plant growth. Bush honeysuckle competes with native plants for pollinators, potentially resulting in fewer seeds set on native species. Unlike native shrubs, the fruits of nonnative bush honeysuckles are carbohydrate-rich (sugar) and do not provide migrating birds with the high-fat content needed for long flights."

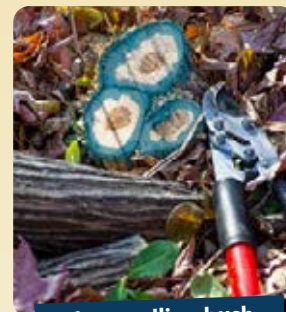


Bush honeysuckles are one of the first plants to leaf out in the spring and one of the last to drop their leaves in the fall, giving them the upper hand over native species.



### How to Control It

When the plant is small and the soil is moist, hand pulling is an option if the entire plant, including roots, can be removed. For larger plants, the cut-stump method and basal bark treatments can be applied. The cut-stump method involves cutting the bush off at the ground level and immediately applying a herbicide solution to cover the surface of the freshly cut stump. The basal-bark method consists of spraying a herbicide mixture to the bush's stems to a height of 12 to 15 inches from the ground. Their competitive edge also leaves them vulnerable to control — spray the leaves in early spring or late fall with a herbicide solution before or after the leaves of native plants are present. Finally, fire assists in the control of honeysuckle if there is enough fuel and the area can be burned safely. Burn every spring or every other spring for several years to control resprouting.



If controlling bush honeysuckle with the cut-stump method, be sure to treat the stump with a recommended herbicide immediately after cutting it or the stump will resprout vigorously.

### Alternative Native Plants

- ✓ Spicebush
- ✓ Arrowwood
- ✓ Ninebark
- ✓ Buttonbush

For more information visit [short.mdc.mo.gov/ZhH](https://short.mdc.mo.gov/ZhH)



## HUNTING PUBLICATIONS AVAILABLE

### Migratory Bird and Waterfowl Hunting Digest

MDC's new *Migratory Bird and Waterfowl Hunting Digest 2020–2021* is now available online and wherever permits are sold. Learn more about waterfowl hunting in Missouri and view the digest online at [short.mdc.mo.gov/ZQg](https://short.mdc.mo.gov/ZQg).



This handy, free guide has detailed information on permit and duck-stamp requirements, hunting seasons and limits, hunting areas, regulations, and more.

New points of note for the upcoming season include:

- The cost of nonresident hunting permits has gone up for the first time since 2009.
- The bag limit for scaup is now two (both species combined) for the first 45 days of the season in each zone. For the last 15 days of the season in each zone, the bag limit is one scaup. Possession limits also follow this pattern.
- Due to spring flooding, some conservation areas may have sections closed for repair and/or have reduced habitat for dove and waterfowl hunting. For an update on conditions at managed waterfowl hunting areas, search "preseason wetland area status" beginning in August at [mdc.mo.gov](https://mdc.mo.gov).
- The COVID-19 pandemic may impact waterfowl drawings. MDC is committed to providing hunting opportunities, and any adjustments to drawing procedures will be communicated as soon as possible.

**Buy Missouri hunting and fishing permits from vendors across the state, online at [mdc.mo.gov/permits](https://mdc.mo.gov/permits), or through MDC's free mobile app, MO Hunting, available for download through Google Play or the App Store.**

### Fall Deer and Turkey Hunting Regulations and Information

The new *2020 Fall Deer and Turkey Hunting Regulations and Information* booklet is now available wherever permits are sold and online at [short.mdc.mo.gov/ZgS](https://short.mdc.mo.gov/ZgS).

The booklet has detailed information on fall deer and turkey hunting seasons, limits, permits, managed hunts, regulations, conservation areas to hunt, post-harvest instructions, and more.



Changes for the upcoming season include:

- Closure of flood-prone areas in southeast Missouri to hunting, except waterfowl, during deer and turkey seasons when river levels exceed certain limits.
- Changes involving CWD management, including carcass transportation.
- Removal of the antler-point restriction for Clark County and inside the Columbia city limits.
- An increase in nonresident permit prices.
- Hunters may no longer use a Firearms Antlerless Deer Hunting Permit in Atchison County.
- Hunters may now fill two Firearms Antlerless Deer Hunting Permits in Lincoln and Montgomery counties, and in Cass County outside the urban zone.
- To qualify for no-cost resident landowner permits, you now must own at least 20 acres in one contiguous tract.
- Nonresidents who own at least 75 acres in one contiguous tract in Missouri may now buy deer and turkey hunting permits at reduced prices.
- To get landowner permits, you must submit information about your property by filling out a Landowner Permit Application.
- Qualifying landowners may now receive two Resident Landowner Firearms Antlerless Deer Hunting Permits in Newton County.
- Archery Antlerless Deer Hunting Permits may now be used in Scott County.
- New managed deer hunts have been added, and others have been removed or modified.
- Deer hunting regulations have changed for some conservation areas.
- A limited elk hunting season will be held in Carter, Reynolds, and Shannon counties.
- There is a new definition for handgun.

## WHAT IS IT?

### STONY POINT CONSERVATION AREA

Scattered clumps of woody cover, located at Stony Point Conservation Area (CA), makes this field ideal for quail and other grassland birds. At 960 acres, Stony Point CA, located in Springfield, is a mosaic of prairie, brushy draws, and thickets. In addition to grassland birds, fair populations of rabbits and deer inhabit the area. Prescribed burning, grazing, and haying are used to maintain the area.







# Prairie VOICES

MISSOURIANS TALK ABOUT THE  
IMPORTANCE OF PRAIRIES

by Kathy Love

Less than one-half of one percent of Missouri's original 15 million acres of prairie remain. The biomass that extended from the tips of their roots 8 to 10 feet underground to the grasses that waved over the heads of horseback riders has receded from the landscape. We are only now beginning to fathom what has been lost.

The voices captured here belong to Missourians whose work helps us understand and restore pieces of the vast grassland that once made up one-third of our state.

Sunset illuminates  
a Dunn Ranch  
prairiescape

PHOTOGRAPH BY  
NOPPADOL PAOTHONG



## The Hunter

### RUDI ROESLEIN

The head of a massive bull elk overlooks the light-filled living room of Rudi Roeslein's log home near Linn. It is one of many trophy mounts that testify to Roeslein's passion for hunting.

When he acquired his property in 1992, he set out to manage it for wildlife with the help of then MDC Private Land Services (PLS) Biologist Jennifer Battson. He showed her around the acreage and remembers Battson saying, "Wow, Rudi, that's a lot of clover. That's a lot of fescue." She assured him there was nothing "wrong" with those plants, but to ensure good wildlife populations, he needed successional plants, including tall grasses that allowed space for nesting and for young quail and turkey chicks to chase bugs.

In 2008, he acquired 1,100 acres in north Missouri and enlisted another PLS biologist, John Murphy, for guidance. He told Murphy he wanted habitat for deer and turkey, but also pollinators.

"It's like an evolution," he said. "First, the hunter wants to catch and kill his limit. Then he wants that trophy animal.

60,000:  
ACRES OF PRAIRIE  
LEFT, OUT OF 15 MILLION.

Northern  
bobwhite chick

QUAIL: JIM RATHER; OPEN PRAIRIE GROUND: DAVID STONNER



Then there is a gradual awakening and he sees the butterflies, the birds, the minute little bugs that share that habitat and he realizes, you have to have it all in balance in order to survive and thrive.”

Twelve years later, he has 500 acres of restored and reconstructed native grasses and forbs and 600 acres of savannah. Now his goal is to convert 30 million acres of land to prairie in 30 years.

He wants to restore not only prairie, but the prosperity of rich north Missouri farmland.

Roeslein is working with Argon Laboratories and the California Air Board to quantify the value of carbon sequestration by prairies for possible trade in carbon tax credits. Soil and water erosion tax credits would give native prairies the commercial value to compete with crops on land that is highly erodible and should not be planted into corn and beans.

“This value chain would give farmers a much needed diversification into renewable energy and provide ecological services that would add value to society, the farmers, and wildlife,” said Roeslein.



Monarch perches on New England aster

#### Mora Prairie

2.5  
TRILLION:  
TONS OF CARBON IN THE SOIL,  
COMPARED WITH 800 BILLION  
TONS IN THE ATMOSPHERE.

Greater prairie-chicken

## The Family Business

### HAMILTONS NATIVE OUTPOST

Amy and Rex Hamilton met while working at the Soil Conservation Service (what is now the Natural Resources Conservation Service). They shared an interest in conservation practices and respect for the farmers they served, who were trying to improve their land — and profit — by working with nature.

“Historically, overgrazing was a major problem,” said Amy. “Then along came fescue. It stands up well in winter and responds to fertilizer, so a lot of people adopted it. But it also has an endophyte that produces a toxin that causes high temperatures in cattle.”

“Fescue also has an inhibitory effect on soil health,” added her daughter, Elizabeth Steele. “It isn’t as deeply rooted as warm season grasses, which limits its ability to form organic matter in the soil. And its thick mat eliminates habitat for quail and other ground-nesting birds.”

The solution? Native grasses and wildflowers. The Hamiltons began harvesting and selling native plant seeds in 1981.

Steele cites a study showing that a diverse field of native cool season grasses, warm season grasses, legumes, and wildflowers is 238 percent more productive than a monoculture.





Bobolink

Prairie pasture with abundant foxglove beardtongue

"It all comes down to how we are going to feed an expanding population," said Amy. "We have to figure it out, and soil health is the basis."

Amy reflected on the balance of nature that evolved on the prairie.

"Prairies aren't being made anymore," she continued. "The patterns that huge herds of bison laid on the land are long gone. We can't go back. But if grazing is done well, it can improve the health of the animals, the soil, and habitat for wildlife."

## The Rancher

### DAVE HAUBEIN

Dave Haubein is the fifth generation using his family's land to make a living in the southwest Missouri community of Lockwood. Farmer, rancher, and businessman, Haubein retired in 2011 so he could devote more time to restoring his grazing land and practicing new soil health techniques on row crops.

About half of his 4,800-acre farm is in row-crops and half is in pasture. His cattle, Angus and Hereford/Angus crosses, spend their summers relishing warm season native grasses that Haubein restored. He planted forbs for diversity and established

"rest areas" that are never planted or grazed, but remain available for pollinators. In the winter, the cattle transition to cover crops that have been planted after his row crops are harvested.

Seed for the cover crops are planted into the corn and soybean residue without plowing. The grazing cattle stimulate the soil with their hooves and manure, impacting the land much like the bison that grazed on the prairie more than a century ago.

Haubein says he is really impressed with the weight gains his cattle make using this strategy. "From an economic standpoint, we feel we're headed in the right direction."

The National Audubon Society consulted with Haubein and other producers in 2006 as they began to develop their Conservation Ranching program. It is intended to link ranchers with the emerging market for grass-fed beef while restoring native grasslands for bird habitat.

The American burying beetle is endangered statewide and nationally. This brightly patterned beetle specializes in cleaning carrion from the landscape and returning nutrients to the soil. In 2012, MDC began restoration efforts with the release of 300 beetle pairs at Wah'Kon-Tah Prairie in Cedar and St. Clair counties.

American burying beetle







Scissor-tailed flycatcher

“Eighty-five percent of grass-fed beef you see in the stores is imported,” Haubein said. “There’s growing demand for local, humanely produced meat without antibiotics or hormones.”

MDC’s Private Land Services Biologist Rick Rath helped Haubein develop a habitat management plan that follows Audubon protocols. Haubein consulted NRCS for help with crop advice and soil health. He is learning that the combined strategies benefit the herds as well as the birds.

“You have to factor in the benefits of soil health and the enjoyment you get from wildlife to fully embrace the Audubon program,” Haubein said.

He believes ranchers around the state could replicate what he is doing. Some of his neighbors, in fact, are doing just that. Prairie bird populations are responding. Quail, scissor-tailed flycatchers, and shrikes are coming back.

## The Teacher

### KEVIN MOUSER

Kevin Mouser takes his students to the prairie at least four times a year. Though they have grown up surrounded by farm fields, forests, rivers, and streams in the scenic southwestern community of Noel, they are amazed at the diversity of life on the prairie.

“Our first visit is a ‘drive-by,’” Mouser said. “I ask them to take cell phone pictures as we slowly pass it. The pictures will be context for our next, in-depth visit so they can see the difference between seasons.”

The next visit is usually after a burn. (Prairies need to be burned regularly to eliminate the accumulation of dead plant material from previous years’ growth.)

“The kids think the prairie has been destroyed, but the following visit just takes their breath away, seeing all the flowering plants that return after a burn.

“I tell them to fan out, as far as they can go and still see me,” he said. The kids crawl around on their hands and knees, discovering the variety of life found among the native plants.

46:  
THE WORLD  
RECORD  
NUMBER OF  
PLANT SPECIES  
FOUND IN ONE  
20- BY 20-INCH  
SQUARE ON  
A MISSOURI  
PRAIRIE.

Prairie fires remove dead undergrowth, making space for plant renewal and regrowth.

Their outdoor laboratories are Diamond Grove Prairie, a conservation area, and Carver Prairie, owned and managed by the Missouri Prairie Foundation. There they learn the principles of mutualism and symbiosis — how plants and animals depend on each other for the benefit of both — and the difference between conservation and preservation.

They may also get to visit Prairie State Park to study how bison have used and impacted prairie over millennia.

Mouser shows the students how the deep roots of prairie grasses, such as big bluestem, can sequester carbon, and how legumes use bacteria to create nitrogen.

“They really make the connection between what we’ve studied in class with what they find on the prairie.”

The students are a study in diversity themselves — white, Hispanic, Somali, Pacific Islanders, Thai — and they marvel at the benefits of diversity on the prairie. A species count is always part of the curriculum and includes plants, birds, insects, mammals, and reptiles.

“We talk about self-supporting networks on the prairie,” Mouser said. “They count the number of plants visited by hummingbirds, for example, or look at monarch eggs on milkweed. It’s all about teaching them how all the organisms are working together for mutual benefit.”





Diamond Grove Prairie

THE NUMBER OF  
SPECIES THAT  
DEPEND ON  
PRAIRIE HABITAT:

INSECTS  
728

BIRDS  
19

MAMMALS  
7

REPTILES AND  
AMPHIBIANS  
20



Dunn Ranch

Scientists are learning the essential role fungi play in successful prairie restoration.

## The Scientist

### ALICE TIPTON

Alice Tipton was a self-described “weird kid” growing up in St. Louis. Her heroes were Rachel Carson and Jane Goodall. She wanted to help save the planet when she grew up and assumed she would have to move to a tropical rain forest or coral reef to make a difference. Instead, she discovered the creatures that lived beneath her feet were just as interesting.

She learned, for example, that the microorganisms that live in soil make plant growth possible by channeling water and nutrients through the soil to plant roots. Without the interaction between the organisms and plants, life on earth would not exist.

Tipton’s research on the mycorrhizal fungi of remnant prairie soils is helping landowners manage and restore critically important native landscapes. New advances in DNA testing allow Tipton to identify and trace thousands of mycorrhizal fungi. These fungi interact with more than 80 percent of the plants on earth. They help plants get nutrients from the soil and the plants provide the fungi with sugar. This “mutualism” is found in every habitat in Missouri, yet it is poorly understood.

Tipton discovered that some of the remnant prairie fungi were less common or absent in places that had been farmed in the past. This might be because tilling or fertilizers change

the relationship between the plants and fungi. Introducing fungi from remnant prairie soils may improve conditions for native plants.

As a biology professor at Lincoln University, Tipton explains the link between plants and fungi to her students by taking them to the school’s farm, where stands of native grasses offer a hint of the vast prairie landscape that greeted settlers 200 years ago.

To find a prairie near you, visit MDC’s *Places to Go* online at [short.mdc.mo.gov/Z4V](https://short.mdc.mo.gov/Z4V). You can also visit the Missouri Prairie Foundation website, [moprairie.org](https://moprairie.org). For technical information about prairies, visit [short.mdc.mo.gov/Znq](https://short.mdc.mo.gov/Znq). ▲

Kathy Love edited the Missouri Conservationist from 1989–1997. She worked to ensure the voices and views of all Missourians were valued in guiding the management of our conservation heritage.



Prairie  
blazing  
star







# HUNTER SAFETY

FOUR RULES TO ENJOY YOUR DAY AFIELD

by Brian Flowers



Through education and incident investigation, hunters learn how to make hunting safer.

PHOTOGRAPH BY DAVID STONNER





Conservation agents conduct thorough investigations of hunting incidents to determine the exact cause. This work helps prevent future incidents.

A gray file cabinet sits in the corner of my office. In it, plain manila folders are filled with reports, maps, and witness statements. These are the artifacts of beautiful mornings marred by tragedy and crisp fall days that ended a life too soon. During my career, I've worked as a hunting incident investigator — that person you never want to see in the field. The person that is called when things have gone terribly wrong.

As hunting incident investigators, we care deeply about finding the truth and it's not always easy or cut and dry. We step back and let the evidence tell us what happened and follow where it leads. We often call what we do "CSI in the woods," a nod to some of those Crime Scene Investigation shows on TV. No matter what we find, our goal is always to share what we learned with hunters to prevent future hunting incidents. In most cases, these incidents are preventable.

Statistically, hunting is a safe outdoor activity, resulting in fewer injuries than other popular sports and daily activities. According to the International Hunter Education Association (IHEA), out of the 11.5 million hunters in the U.S, in an average year fewer than 1,000 people are involved in a hunting-related shooting. Of those, fewer than 75 are fatalities. Due to the widespread use of blaze orange and mandatory hunter education programs, hunting incidents have declined in the last 30 years. Hunting is safe and getting safer.

Every season, Missouri hunters enjoy time spent in the field. We enjoy watching younger hunters discover the magic of hunting as we pass down traditions that our parents and grandparents taught us. We expect to go to the field to hunt, have a good time, and return home safely. Unfortunately, when hunters don't follow the basic rules of safe hunting and firearms handling, things can go wrong.

Let's examine the top four rules for a safe hunt.



## 1 ALWAYS POINT THE MUZZLE IN A SAFE DIRECTION

When people are asked, what's the number one rule of firearms handling, most will answer quickly and with authority, always treat every gun as if it were loaded. That seems like common sense, but it's wrong. Hunter education teaches **the number one rule is always point the muzzle in a safe direction**. Also known as "muzzle control." The muzzle is best defined as the business end of the barrel. If the person handling the firearm always thinks about muzzle control first, they will never point at anything they don't wish to harm or destroy. Muzzle control is the key to firearms safety and the proper handling of all firearms. It determines everything we do with that firearm, how we hold it, what carry is appropriate, and if a shot is safe and legal. Once proper muzzle control is established, the handler can then check to see if the firearm is loaded and if the safety is engaged. By following this one rule, most incidents can be avoided.



## 2 IDENTIFY YOUR TARGET AND WHAT IS BEYOND

One common shooting-related hunting incident is known as "victim mistaken for game." Invariably those involved will say, "I thought I was shooting at" fill in the blank with whatever species you like. Some hunters allow themselves to see what really isn't there. They hear movement, see color or shape, and in their mind, it appears to be an animal. **Rule number two is always 100 percent identify your target and what's beyond it.** Ethical hunters always identify their target as safe and legal before pulling the trigger. The shooter must also check what's beyond the target and never shoot at an animal on the horizon where there's no safe backstop for the projectile. A turkey only looks like a turkey and a deer a deer. Always assume that sound or movement in the woods is another person until it reveals itself otherwise. Follow this rule and you'll be on your way to being a safe hunter.





### 3 KEEP YOUR SAFETY ON

Most modern firearms are equipped with some form of safety. A safety is a device that, when engaged, blocks the action of the firearm from firing. **Rule number three is always keep your safety on until you're ready to shoot.** Hunters can be tempted to release the safety too soon, but don't fall for that. First, establish that your shot is safe and in the case of hunting, that your target is legal. Once you do, then and only then, should you release the safety of your firearm. Of course, engaging the safety doesn't make your firearm safe, only you can make your firearm safe. While your firearm may or may not be equipped with a safety, you always have a safety on-board, and that's your brain. Think first, always follow the firearm safety rules, and then you'll be safe.



### 4 KEEP YOUR FINGER OFF THE TRIGGER

Hand a firearm to an inexperienced shooter and often the first thing they'll do is put their finger on the trigger. That's where your finger goes, right? Wrong! **Remember rule number four: the finger only goes on the trigger when you are absolutely ready to fire.** If you're a hunter, then you've identified your game and determined it's a safe shot. Only then do you place your finger within the trigger guard and on the trigger for a shot. When walking with a firearm, keep the finger off the trigger and along the receiver of the firearm. If you trip or fall, the firearm has less of a chance of accidental discharge.





These are not all the safety rules, but these four simple rules lay the foundation for every other rule in the book. There's a reason these rules are printed in books, manuals, and pamphlets — good people have ignored them and lost.

After years of investigating and studying hunting incidents, I still love to hit the field with my firearm for a long hunt with family and friends. I relish the opportunity to share my hunting knowledge with

the younger generation. More beautiful mornings and crisp fall days are ahead, so please hunt safe out there. ▲

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*Brian Flowers serves as a regional supervisor and adjutant instructor for the IHEA National Hunting Incident Academy. He resides in Columbia with wife JoAnne and enjoys exploring Missouri's outdoors.*

## Sign Up for Hunter Education

With deer season just around the corner, avoid the rush and sign up for a hunter education course through MDC.

Missouri requires hunter education for anyone born on or after Jan. 1, 1967, and buys a firearms season hunting permit, or any person age 11 to 15 who hunts alone. The course provides instruction on firearms, safety, skills, and ethics.

MDC provides several ways to become hunter education certified. The course is divided into a knowledge section and a skills session that includes an exam. Both the knowledge and skills portion must be completed to become certified.

An online program is one option, which can be done from anywhere with computer and internet access. Participants 16 and older can complete the entire course online and don't need to attend an in-person skills session. Participants 11 to 15 can complete the knowledge requirement online, but must attend and pass a skills session to receive certification. The cost for those who complete the course and pass the exam is \$19.95. Study guides are available for free at MDC offices or by ordering them online.

For those preferring a traditional, in-person educational approach, MDC also offers a free, four-hour classroom session to satisfy hunter knowledge requirements. This includes lectures, videos, and filling out chapter reviews.

Missouri Hunter Education courses are offered at varying dates at MDC facilities, as well as at conservation partner locations across the state. For more information, visit, [short.mdc.mo.gov/ZkY](http://short.mdc.mo.gov/ZkY).





# The Silencing of *Missouri's* *Iconic Nightjars*

NATURAL HISTORY AND DECLINES OF THE EASTERN  
WHIP-POOR-WILL AND CHUCK-WILL'S-WIDOW

by Norman Murray

A chuck-will's-widow sits on  
a branch preparing for its  
evening serenade.

PHOTOGRAPH BY JIM RATHERT







**T**he Ozark forests host their own nightly symphony during the growing season, featuring different movements as the months progress. When I grew up in rural southern Missouri Ozarks without air conditioning, my bedroom window was always open at night, and I learned to love the nightly serenade and slept well — no need for “white noise” devices.

This evening harmony is iconic to those growing up in the Missouri Ozarks. As sunset nears, chirping spring peepers provide the opening bars of the music, hesitant at first and then expanding into full chorus, welcoming spring. As temperatures warm, the depth of the music swells dramatically. The rhythmic percussion of katydids pulsates through the canopy. Cicada calls rise and fall in volume, almost in unison. Added in is the progression of amphibians — American toads, southern leopard frogs, and bullfrogs — adding the background chords.

Suddenly, the lilting melody of the symphony is heard ringing above the din: whip-poor-WILL or chuck-will’s-WIDow. These calls repeat over and over, with 50–100 repetitions, and sometimes exceeding 1,000 (whip-poor-will) and 800 (chuck-will’s-widow) consecutive calls.

This melody comes courtesy of two birds named after their raucous calls — the eastern whip-poor-will and chuck-will’s-widow.

If you are close enough to hear the complete call of an eastern whip-poor-will, you will hear a very crisp “cluck” just before the “whip-poor-will.” The bird is named for the portion of the call most people hear, but getting close enough to hear the cluck is like getting close enough to a strutting gobbler to hear the low frequency drumming — you never forget it.

A close cousin, the chuck-will’s-widow also sings its name during the early night and early morning hours. The calls of these birds are as much a part of the Ozark summer landscape as burr oaks, katydids, and spring-fed streams.

## Meet the Nightjars

Both birds, members of a family known as nightjars, feed heavily on flying insects after dark and just before daylight with the aid of unassuming small delicate bills that open to reveal large, gaping mouths. This maw scoops up beetles, large moths, grasshoppers, mosquitoes, and other insects while flying through their habitats. Chuck-will’s-widows, the larger of the two species, has even been seen occasionally eating small birds and bats. Both species also have long, stiff feathers surrounding their mouths that help guide prey into their mouths. Long, rounded wings produce buoyant, agile flight that allows them to navigate wooded habitats at night and pursue fleeing insects by making rapid, even 180-degree, turns or flying nearly vertically. Moonlit nights provide opportunity for night-long feeding and extended serenading.

Both birds are cryptically colored with brown and gray-mottled plumage, providing excellent camouflage while on the ground in vegetation. The chuck-will’s-widow is tan, has a larger, blockier head with a tan line bordering its brown-red throat. The whip-poor-will has a white band below a black



A chuck-will's-widow blends in nicely with its chosen resting spot thanks to the mottled coloration of its feathers.



When nesting directly on the ground, an eastern whip-poor-will's mottled coloring helps it blend in with its surroundings.





Nestling nightjar chicks' downy fluff makes for excellent camouflage against herbaceous cover.



throat, a rounder, smaller head, and white (male) or buff (female) corners on its tail. In flight, the male whip-poor-will's tail often flashes with the white outer feathers. These nightjars are seldom seen flying in open sky and foraging, like their cousin, the common nighthawk. Rather, they forage in erratic flight near wooded cover. Both species perch on the ground, logs, or tree branches. Chuck-will's-widows will sometimes use natural tree cavities or a hollow log for shelter. When flushed, they fly silently with light, mothlike wingbeats. If flushed from incubating their eggs or brood, adults will flop on the ground nearby and fake a wing injury to lure potential predators away from their vulnerable eggs or young.

## The Missing Soloists

Having the opportunity to hear a complete rendition of this Ozark symphony is becoming more difficult. The most notable omissions are the soloists, these vocal nightjars. Many Missourians who grew up lying awake at night are noticing their absence, especially in the northern and central portions of the state. Both birds' worldwide populations have declined dramatically — 63 percent for the chuck-will's-widow and 69 percent for the eastern whip-poor-will — in the last 50 years, according to the Breeding Bird Survey. One-third as many birds are breeding in the U.S. as there were in 1970. In any symphony, the loss of the lead instrument is unacceptable, and the loss of these iconic

birds is no different. The full impact of losing this many insect-eating birds across the state is unknown, as natural systems are complex and hard evidence of declines is difficult to identify and describe. To many of us who love the Ozarks, the decline of these birds goes much deeper, touching our heritage and connection with who we are and where we live.

Although the specific causes of these birds' declines are not completely understood, the most common culprits are the loss of habitat and potentially widespread pesticide use, especially in the northern half of the state. "Whips and chucks" nest in shortleaf pine or oak-hickory wooded habitats with fairly open canopies. This open canopy allows sunlight to reach the forest floor and grow herbaceous vegetation on the ground level. The birds use openings in the forest cover for foraging at night and seem to favor sites with a history of prescribed-fire management, which clears brushy areas that the birds seem to avoid.

Large amounts of Missouri's woodlands have been converted to pasture, housing developments, and other uses that make them unsuitable for their former inhabitants. Much of the remaining forested land has grown a closed canopy with little forest management and thus, very little light reaching the ground. Grazing open woodlands removes the necessary herbaceous vegetation that would have otherwise provided valuable habitat. These conditions provide very little open, suitable wooded habitat for either nightjar.

Because both species lay their eggs on the ground without constructing a nest, the quality of the habitat is crucial for survival of the nest and young. Incubation time is about 20 days, and it takes about another 20 days before the young will be able to fly and escape predators. The young hatch as semi-mobile, tan balls of downy fluff that huddle together on the leaf litter and vegetation. During all this time, remaining motionless and blending in with good habitat protects them from predators' prying eyes. Too little good ground cover leaves them exposed and vulnerable to predation.



## Missouri is Important for Whips and Chucks

Missouri hosts a large proportion of the breeding population of both chuck-will's-widows and eastern whip-poor-wills. The Central Hardwoods Bird Conservation Region, which includes Missouri's Ozarks and parts of Oklahoma, Arkansas, Illinois, Indiana, Tennessee, Kentucky, and Alabama, contains about 11 percent of the world's breeding population of chuck-will's-widows and 30 percent of the planet's eastern whip-poor-wills. If these species fail to thrive here, there is real risk that the keynote melody to the summer-night symphony in Missouri and eastern forests may be lost. While chuck-will's-widows only breed in the Ozark region of Missouri, eastern whip-poor-wills breed in forested habitats throughout the state, except for the bootheel. National bird plans consider Missouri critical to the conservation of these species and the new Missouri Bird Conservation Plan places high priority on these species for attention in savanna, woodland, and young forest habitats.

## Helping the Nightjars

The need is critical, so opportunities to help nightjars and the woodlands on which they depend are many. Restoring or managing Missouri woodlands help a broad suite of bird species in addition to others wildlife like white-tailed deer, wild turkey, and even black bears. Many landowners manage for healthy woodlands and sustain wildlife populations while also benefiting their land-use objectives.



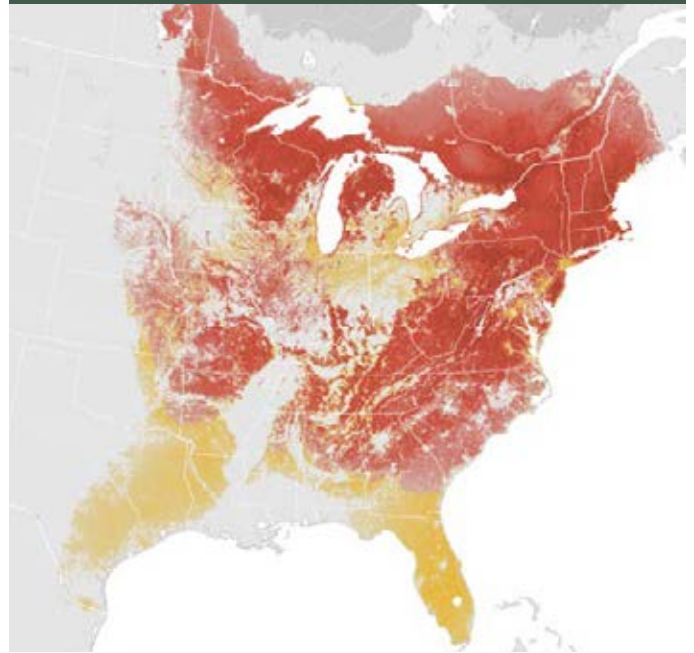
Woodland management also benefits many other species, including the prairie warbler, which also has declined dramatically.

## Manage Your Land

Good woodland habitat management is crucial to the survival of the eastern whip-poor-will and chuck-will's-widow. Well-planned tree harvests and prescribed fires open the canopy and encourage the growth of diverse, native herbaceous plants while limiting growth of dense shrub thickets. Tree harvests also create scattered openings that benefit nightjars and many other species of birds and wildlife, and help rejuvenate the tree stand when done with a proper plan.

Varying the frequency of harvest or prescribed fire helps produce a wider variety of conditions, favoring a diversity of species. Application of treatments likely will depend on local conditions of the terrain and the vegetation characteristics. For

## Eastern Whip-poor-will Abundance Map



■ Breeding season (May 31–July 27)

■ Pre-breeding migratory season (Feb. 22–May 24)

example, a dense stand of pole timber may need more frequent thinning or fire to achieve the desired open canopy with herbaceous ground cover than a mature woodland that already has a structure very close to desired conditions.

## Assistance Available

You can receive professional assistance in managing your wooded habitats to help these birds and other wildlife, improve forest health, or other objectives you may have by talking with a MDC private land conservationist or forester. Contact your local regional office ([short.mdc.mo.gov/ZwC](http://short.mdc.mo.gov/ZwC)), and they can help you get in contact with the appropriate professional. You may receive information, technical assistance, and advice on managing the habitats and wildlife on your property to achieve your objectives and meet the needs of the resources and species that occur on your land. Watch for announcements on prescribed fire trainings in your area to learn how to use this important tool to improve your habitats in a safe manner.

## Be a Citizen Scientist

Citizens can also help track nightjar populations by participating in the United States Nightjar Survey ([nightjars.org](http://nightjars.org)), coordinated by the Center for Conservation Biology at William & Mary College. Data collected from the survey provides valuable information on distribution and population trends to aid conservation efforts.

Landowners and birdwatchers can track their birding observations through the eBird app ([ebird.org](http://ebird.org)) and contribute their observations to a massive database of bird sightings worldwide.





Carefully managing woodlands, including use of prescribed fire, produces habitat that is crucial to Missouri's nightjars.



### Research

MDC staff can help research the resources on your property and understand your management objectives.



### Plan

They can help you develop a plan to manage your property to enhance habitat and wildlife resources to meet your objectives, which often include production goals.



### Execute

Staff can help you with training or finding contractors to accomplish the work in your plan, so you can realize the benefits of your objectives.

Whether you experienced an eastern whip-poor-will calling outside your bedroom window growing up or not, our Ozark nightjars are declining and need our help. If you have the capacity, consider ways to help them by managing your land for habitat. The lead vocal in our nocturnal Ozark symphony depends on it. ▲

*Norman Murray is MDC's natural resource planning section chief. Norman grew up in Douglas County and loves Missouri's rich diversity of habitats and wildlife. He enjoys spending time with his family restoring habitat, native gardening, and enjoying nature through a variety of outdoor activities, especially birdwatching and hunting.*

## Statewide Plan Focuses on Bird Decline

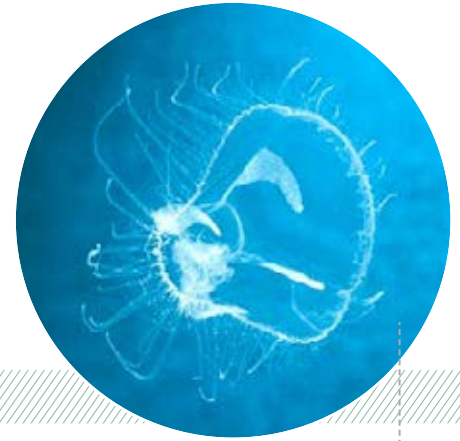
In September 2019, an article in the journal *Science* used long-term bird monitoring data to estimate a net loss of 2.9 billion, or about 29 percent, of our North American birds since 1970. The Missouri Bird Conservation Plan highlights our state's most threatened bird species and broad management guidelines by species for land managers on both public and private property. Eastern whip-poor-wills and chuck-will's-widows both made this list. The plan, which was created by conservation agencies and organizations across the state with technical expertise on bird response to management and long-term declines, is available online at [short.mdc.mo.gov/ZAF](https://short.mdc.mo.gov/ZAF).



# Get Outside

in AUGUST →

Ways to  
connect  
with nature



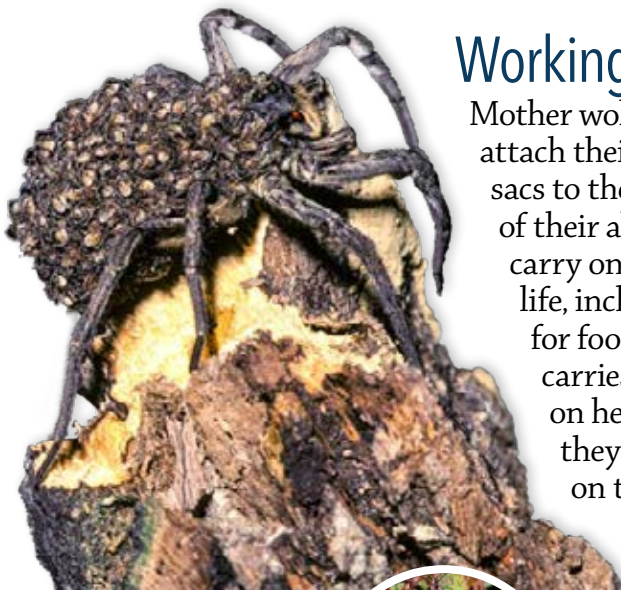
## There's the Rub

If you're looking forward to deer season, here's something that might start you dreaming of white-tailed bucks. Take a hike in the woods and look for rubs on small trees. Male white-tailed deer rub velvet off antlers this time of year. Take the family and make a scavenger hunt out of it!



## Jelly in the Water

You may see **freshwater jellyfish** gently swimming in warm, still waters of ponds and lakes. In Missouri, people usually only see these creatures from July through September, when the surface of the water reaches about 80 degrees F. Missouri's jellyfish are about the size of a quarter and pose no threat to people. They use their tentacles to snare tiny aquatic animals called zooplankton.



## Working Mom

Mother wolf spiders attach their pea-sized egg sacs to the bottom rear of their abdomens and carry on with normal life, including hunting for food. She later carries the babies on her back until they are able to be on their own.



### Natural Events to See This Month

Here's what's going on in the natural world.



Hawthorn fruits mature. The hawthorn is our state flower



Common snapping turtle eggs hatch



Pocketbook mussels begin breeding



# Missouri Snakes

**Northern cottonmouths**, also known as water moccasins, give birth in August. There are usually six or seven in a litter. In Missouri, this is not a widespread species. It only occurs in the southeast corner and in scattered populations in the Ozarks. To learn more about snakes you are encountering, check out *A Guide to Missouri's Snakes* at [short.mdc.mo.gov/ZhD](http://short.mdc.mo.gov/ZhD). To request a free copy by mail, email [pubstaff@mdc.mo.gov](mailto:pubstaff@mdc.mo.gov).



## Visitors from the North

Beginning in August, Missouri welcomes visitors from the north. Whereas it's too early for Santa and his reindeer, these visitors are just as familiar to waterfowl enthusiasts. **Blue-winged teal** return to the Show-Me State just in time for September's teal season. Teal are fast flyers, darting unpredictably over water, making them fun to watch and hunt.



American badgers, a species of conservation concern, breed in early August



Indigo buntings sing on hot, humid afternoons



## BE BEAR AWARE

Help bears stay wild and healthy, and keep yourself and your neighbors safe.

### Hiking, Camping, or at Home

- ▶ **Never feed a bear** on purpose or accidentally.
- ▶ **Always store all** food and garbage securely.
- ▶ **Stay alert** and watch for bear signs such as tracks, scat, or claw marks on trees.
- ▶ **When hiking**, make noise so you don't surprise a bear.
- ▶ **Keep dogs leashed** when hiking and camping.



### If You Encounter a Bear

- ▶ **Leave it alone!** Do not approach it.
- ▶ **Back away slowly** with your arms raised.
- ▶ Speak in a **calm, loud voice**.
- ▶ **Do not turn** your back to the bear.
- ▶ **DO NOT RUN.**
- ▶ **Report all bear sightings** to MDC.

Learn more at [mdc.mo.gov/bearaware](http://mdc.mo.gov/bearaware)



# Places to Go

## NORTHEAST REGION

### Hunnewell Lake Conservation Area

Shelby County area features fine fishing

by Larry Archer

✳ **August frequently sends people** scurrying indoors for relief from the heat, but anglers willing to get an early start or otherwise handle the heat can find some fine fishing at Hunnewell Lake Conservation Area (CA).

Located on 1,905 acres in northeast Missouri's Shelby County, Hunnewell Lake CA's 228-acre namesake waterbody provides a healthy and diverse fish population for anglers, said Hunnewell Lake Hatchery Manager Kurt Hentschke.

"Hunnewell Lake is typically pretty good fishing for bass, bluegill, crappie, the typical stuff," Hentschke said. "It also holds a robust population of blue catfish. It is not uncommon for advanced anglers to catch a blue catfish greater than 20 pounds using rod and reel methods."

The lake also plays a big role in making sure there are many other great fishing holes in Missouri. As the hatchery's water source, the lake contributes to the raising of approximately 700,000 warm-water fish destined to stock ponds and lakes around the state.

Because of the lake's role as the hatchery's water source, several restrictions are in place to protect water quality and prevent the inadvertent introduction of zebra mussels, including a prohibition on the use of privately owned boats and restrictions on certain types of baits.



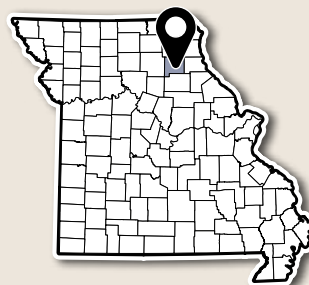
"You're in the early portions right before the dove season. We typically do some dove management, so we'll have some sunflower fields. A lot of times you'll have big number of doves starting to show up in August."

—Hunnewell Lake CA Manager  
Mike Flashpohler

LAKE: NOPPADOL PAOTHONG;  
SUNFLOWERS: DAVID STONNER



The 228-acre Hunnewell Lake offers anglers a wide variety of fishing options, including black bass, catfish, crappie, and sunfish.



## HUNNEWELL LAKE CONSERVATION AREA

consists of 1,905 acres in Shelby County.  
From Hunnewell, take Route Z north 3 miles.

39.7134, -91.8601

[short.mdc.mo.gov/Z7o](http://short.mdc.mo.gov/Z7o) 573-983-2201

### WHAT TO DO WHEN YOU VISIT



**Birdwatching** Included in the Great Missouri Birding Trail ([short.mdc.mo.gov/Z7J](http://short.mdc.mo.gov/Z7J)). The eBird list of birds recorded at Hunnewell Lake CA is available at [short.mdc.mo.gov/Z73](http://short.mdc.mo.gov/Z73).



**Boat Rentals** Free of charge on a first come, first served basis. Private boats prohibited.



**Camping** Individual campsites



**Fishing** Black bass, catfish (channel and blue), crappie, and sunfish

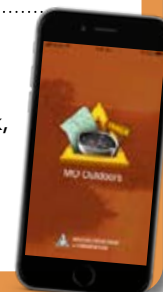


**Hunting Deer and turkey**  
Deer and turkey regulations are subject to annual changes. Please refer to the Spring Turkey or Fall Deer and Turkey booklets for current regulations.

Also **dove, quail, rabbit, and squirrel**

### DISCOVER MO OUTDOORS

Users can quickly and easily find outdoor activities close to home, work, or even while traveling with our free mobile app, MO Outdoors. Available in Android or iPhone platforms at [mdc.mo.gov/mooutdoors](http://mdc.mo.gov/mooutdoors).



### WHAT TO LOOK FOR WHEN YOU VISIT



North American  
river otter



Northern watersnake



Great blue heron



Killdeer





## Bluegill *Lepomis macrochirus*

### Status

Stocked in large numbers

### Size

Length: to about 9½ inches;  
Weight: to about 12 ounces

### Distribution

Statewide



### Did You Know?

Bluegill are a popular sport fish for Missouri anglers. They make excellent table fare.

**B**luegill are a small-mouthed sunfish. Stocked statewide as feed for largemouth bass, their natural range has grown. They occur in many habitats from farm ponds to large reservoirs, but prefer deeper pools and backwaters of low-gradient streams. Bluegill swim in loose groups of 20–30. They can be found feeding in the shallows in the morning and evening, and in the deeper, shadier spots during the midday.



### LIFE CYCLE

Bluegill begin nesting in late May and continue through August. Nests are formed amongst gravel in 1-to-2-inch-deep water. After spawning, males guard the nests until the eggs hatch. Newly hatched fry are on their own, and by age 3 or 4, they have grown 6 inches. Certain non-nesting males, called “sneakers” or “satellites,” have the color pattern and behavior of females. They enter other males’ nest areas and fertilize eggs without alerting the territorial-nest-holding male.



### FOODS

Bluegill are limited by their small mouth. They feed primarily by sight, at all levels of the water, zeroing in on moving objects. When mayflies are emerging, they feed at the surface. Fry eat mainly small crustaceans, while adults eat mostly insects, small fish, crayfish, and snails.



### ECOSYSTEM CONNECTIONS

Bluegill are important aquatic predators in the streams and ponds they occupy. They also provide food for larger fish. The eggs and defenseless fry are eaten by numerous predators.



# Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖

## Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to buy permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you buy permits, find great places to fish, and ID your catch. Get both in Android or iPhone platforms at [short.mdc.mo.gov](http://short.mdc.mo.gov)/Zi2.



## FISHING

### Black Bass

Impounded waters and non-Ozark streams:  
Open all year

Most streams south of the Missouri River:

- ▶ Catch-and-Keep:  
May 23, 2020–Feb. 28, 2021
- ▶ Catch-and-Release:  
Open all year

### Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2020

### Nongame Fish Giggling

Impounded Waters, sunrise to sunset:  
Feb. 16–Sept. 14, 2020

Streams and Impounded Waters,  
sunrise to midnight:  
Sept. 15, 2020–Feb. 15, 2021

### Paddlefish

On the Mississippi River:  
Sept. 15–Dec. 15, 2020

### Trout Parks

Catch-and-Keep:  
March 1–Oct. 31, 2020

Catch-and-Release:  
Nov. 13, 2020–Feb. 8, 2021

## HUNTING

### Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2020

### Coyote

Restrictions apply during April, spring turkey season, and firearms deer season.

Open all year

### Crow

Nov. 1, 2020–March 3, 2021

### Deer

Archery:

Sept. 15–Nov. 13, 2020

Nov. 25, 2020–Jan. 15, 2021

Firearms:

- ▶ Early Youth Portion (ages 6–15):  
Oct. 31–Nov. 1, 2020
- ▶ November Portion:  
Nov. 14–24, 2020
- ▶ Late Youth Portion (ages 6–15):  
Nov. 27–29, 2020
- ▶ Antlerless Portion (open areas only):  
Dec. 4–6, 2020
- ▶ Alternative Methods Portion:  
Dec. 26, 2020–Jan. 5, 2021

### Dove

Sept. 1–Nov. 29, 2020

### Elk

Archery:

Oct. 17–25, 2020

Firearms:

Dec. 12–20, 2020

## New Elk Hunting Season

MDC will offer Missourians the state's first elk-hunting season in modern history starting this fall. Learn more at [short.mdc.mo.gov/Znd](http://short.mdc.mo.gov/Znd).

### Groundhog (woodchuck)

May 11–Dec. 15, 2020

### Pheasant

Youth (ages 6–15):  
Oct. 24–25, 2020

Regular:

Nov. 1, 2020–Jan. 15, 2021



### Quail

Youth (ages 6–15):  
Oct. 24–25, 2020

Regular:

Nov. 1, 2020–Jan. 15, 2021

### Rabbit

Oct. 1, 2020–Feb. 15, 2021

### Sora, Virginia Rails

Sept. 1–Nov. 9, 2020

### Squirrel

May 23, 2020–Feb. 15, 2021

### Teal

Sept. 12–27, 2020

### Turkey

Archery:

Sept. 15–Nov. 13, 2020

Nov. 25, 2020–Jan. 15, 2021

Firearms:

- ▶ Fall: Oct. 1–31, 2020

### Waterfowl

See the Migratory Bird and Waterfowl Hunting Digest or visit [short.mdc.mo.gov/ZZx](http://short.mdc.mo.gov/ZZx) for more information.

### Wilson's (Common) Snipe

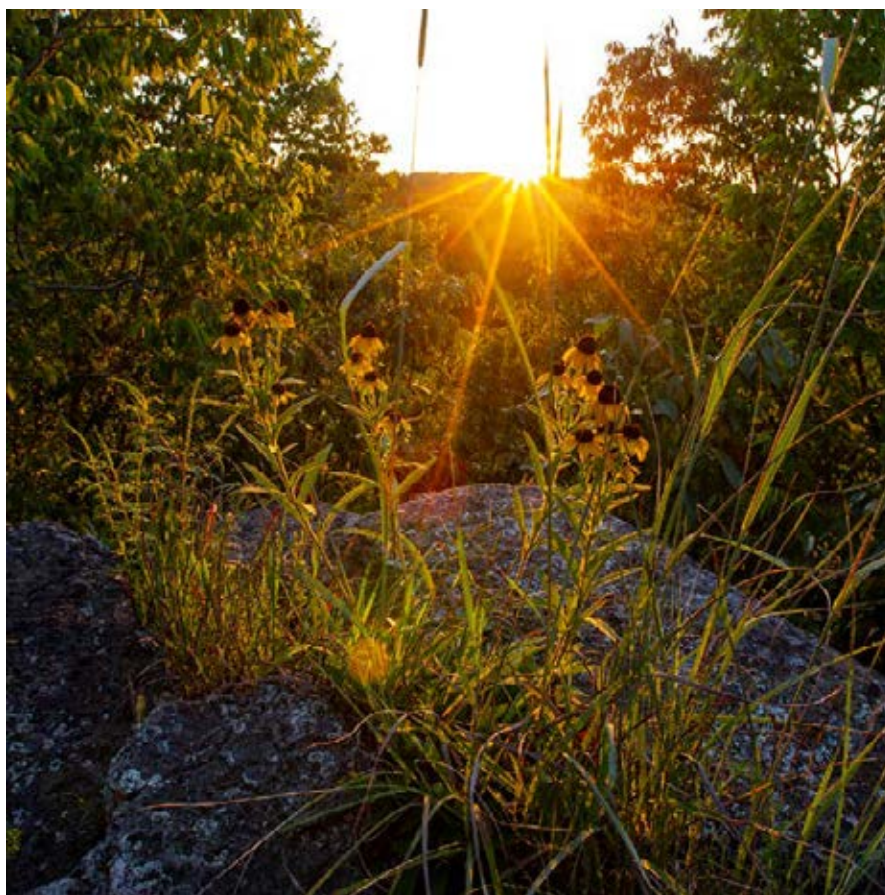
Sept. 1–Dec. 16, 2020

### Woodcock

Oct. 15–Nov. 28, 2020

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code of Missouri* at [short.mdc.mo.gov/Zib](http://short.mdc.mo.gov/Zib). Current hunting, trapping, and fishing regulation booklets are available from local permit vendors or online at [short.mdc.mo.gov/ZZf](http://short.mdc.mo.gov/ZZf).





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The sun rises over Piney River Narrows Natural Area, Texas County, revealing a small patch of Missouri coneflowers (*Rudbeckia missouriensis*). As a new day dawns in your backyard, what will you discover?

📷 by **David Stonner**